REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1, 4-8, 10-16, and 18 are presently active in this case, Claims 1 and 11 amended and Claims 9 and 17 canceled by way of the present amendment.

In the outstanding Official Action, Claims 1, 4, 11 and 12 were rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 5,771,250 to Shigehara et al. and Claims 5-10 and 13-18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Shigehara et al.

First, Applicants wish to thank the Examiner for the April 9, 2004, personal interview at which time the outstanding issues in this case were discussed. During the interview, Applicants presented amendments and arguments substantially as indicated in this response. While no formal agreement was reached, the Examiner indicated that the amendments and arguments presented herein would overcome the outstanding rejection.

Turning now to the merits, Applicants' claims are directed to an external cavity laser that can be used as a signal light source. As described in relation to background Figure 5 of Applicants' specification, prior art external cavity lasers generally included a laser device 10 coupled to a fiber 20 having a fiber Bragg grating 22 that forms a resonating cavity between the laser device 10 and the grating 22. As seen in Figure 5, the device also includes a connector 30 at the end of the fiber 20. As discussed in the April 9 interview, the present inventors discovered that even a very small reflection from the connector 30 prevents the external cavity laser from achieving a desired signal to noise ratio.

Specifically, as shown in Figures 6 and 7, the present inventors conducted experiments to confirm that conventional external cavity lasers do not achieve a relative intensity noise (RIN) level of -130 dB/Hz that is required for the desired transmission quality

of transmit signals such as picture transmission. Having discovered this problem in the conventional external cavity laser configuration, the present inventors further discovered that an optical device can be placed between the grating and connector of the conventional configuration in order to intercept waves reflected from the connector. In order to expedite issuance of a patent in this case, Applicants have amended independent Claims 1 and 11 to recite an intercepting means or device configured to intercept waves reflected from the connector so that the external cavity laser maintains a relative intensity noise (RIN) less than -130 dB/Hz in a transmission band having frequencies equal to or less than 10 gHz.

In contrast, the cited reference to Shigehara et al. discloses an optical time-domain reflectometry (OTDR) apparatus for detecting backscattering light of an optical fiber to be measured and for measuring a characteristic at each point of the optical fiber in a particular wavelength of light using the laser light source apparatus. As shown in Figure 27 Shigehara et al., for example, the OTDR apparatus includes a test laser source 110 having an external fiber Bragg grating 35. An isolator 91 is interposed between the grating 35 and a band pass filter 92 of the test set-up. However, Shigehara et al. does not disclose anything about the RIN characteristics of the test set-up. As discussed in the April 9th interview, RIN is not a concern for the OTDR test apparatus. Thus, Shigehara et al. does not disclose providing an intercepting means or device configured to intercept waves reflected from the connector so that the external cavity laser maintains a relative intensity noise RIN less than -130 dB/Hz in a transmission band having frequencies equal to or less than 10 GHz. Moreover, this feature is not inherent to the isolator 91 disclosed in Shigehara et al. As discussed in the April 9 interview, it is not a necessary component of an isolator to provide the RIN value recited in Applicants' independent Claims 1 and 11. Accordingly, Shigehara et al. does not anticipate Claims 1 and 11 as amended herein.

With regard to the outstanding Office Action's position that the RIN value is merely an optimization of a workable range under In re Aller, Applicants note that a particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of the variable might be characterized as routine experimentation.[1] Since the RIN variable is not discussed in Shigehara et al., it is clear that Shigehara does not recognized RIN as a result effective variable to providing improved transmission quality in a light source.

Moreover, even if RIN were disclosed in the prior art to be a desirable characteristic of transmission quality as discussed above, it is the present inventors that discovered that even small reflections from the connector in a conventional external cavity laser configuration presents problems that cause undesirable RIN. It is settled law that

> "a patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified. This is part of the "subject matter as a whole" which should always be considered in determining the obviousness of an invention under 35 U.S.C. § 103.[2]

Thus, the present inventors discovered that providing an intercepting means or device configured to intercept the waves reflected from the connector so that the external cavity laser maintains a RIN less than -130 dB/Hz provides an unexpected result of improved transmission quality in an external cavity laser configuration having a connector used in a communication system. This unexpected result is not disclosed in Shigehara et al.

For the reasons discussed above, independent Claims 1 and 11 patentably define over the cited reference to Shigehara et al. As the remaining pending claims depend from either Claim 1 or 11, these remaining claims also patentably define over the cited references.

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1 In re Antonie 559 F.2d 618, 195 USPQ 6 (CCPA 1977).

2 In re Sponoble 160 USPQ 237, 243 (CCPA 1968).

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal Allowance. An early and favorable action is therefore respectfully requested.

Respectfully submitted,

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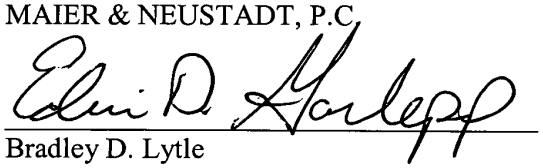

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